

WHAT IS CLAIMED IS:

1. An image forming device comprising:

means for forming an image comprising:

means for carrying an electrostatic latent image;

means for developing that forms a developing nip by contacting with the means for carrying and develops the latent image by using toner; and

means for transferring that forms a transferring nip by contacting the means for carrying and transfers a toner image onto a recording paper;

means for impressing a transferring voltage that impresses to the means for transferring, a voltage of an opposite polarity to a polarity of a transfer process, for a prescribed period of time during a period when the recording paper is absent in the transferring nip; and

means for impressing a developing voltage that impresses to the means for developing, a voltage of a same polarity as a developing process and lower than the developing process when a field impressed with the voltage of the opposite polarity by the means for impressing the transferring voltage passes the developing nip.

2. The image forming device according to claim 1, wherein the means for carrying stops rotating after making at least one rotation after a field located at the transferring nip when the voltage impressed to the means for transferring is switched off reaches the developing nip.

3. The image forming device according to claim 1, further comprising:  
means for scanning by laser that includes a polygon motor and forms the electrostatic latent image by irradiating laser light on the means for carrying;  
and

means for controlling to rotate the polygon motor at a prescribed rotational speed for a predetermined period of time even after the means for forming the image stops.

4. The image forming device according to claim 3, wherein the means for forming the image is stopped by stopping the means for carrying.

5. The image forming device according to claim 3, wherein the means for forming the image is stopped by stopping means for transporting the recording paper.

6. The image forming device according to claim 3, wherein the predetermined period of time can be set.

7. The image forming device according to claim 6, further comprising:  
means for clocking a time from an end of a previous driving of the means for forming the image until a start of a next driving of the means for forming the image;

means for accumulating and storing clocking results of the means for clocking; and

means for setting the predetermined period of time in accordance with one or a plurality of the clocking results stored in the means for storing.

8. The image forming device according to claim 1, further comprising:  
a first means for driving the means for forming the image;  
means for transporting the recording paper;  
a second means for driving at least a part of the means for transporting;  
and

means for controlling to differ timings of a start of driving of the first means for driving and a start of driving of the second means for driving.

9. The image forming device according to claim 8, wherein the means for controlling starts to drive the second means for driving after the first means for driving starts driving.

10. The image forming device according to claim 1, further comprising:  
a first means for driving the means for forming the image;  
means for transporting the recording paper;  
a second means for driving at least a part of the means for transporting;  
and  
means for controlling to differ timings of a stop of driving of the first  
means for driving and a stop of driving of the second means for driving.

11. The image forming device according to claim 10, wherein the  
means for controlling stops the driving of the second means for driving before  
the first means for driving stops driving.

12. The image forming device according to claim 1, further comprising:  
a first means for driving that rotates the means for carrying and the  
means for transferring;

means for scanning by laser that includes a polygon motor and a second  
means for driving that rotates the polygon motor;

a first means for controlling that starts driving of the first means for  
driving and the second means for driving at a same time; and

a second means for controlling that executes a cleaning sequence process  
to return toner adhered on the means for transferring back to the means for  
carrying during a period from a start of the driving of the second means for

driving until a print permitting signal is output by the means for scanning.

13. The image forming device according to claim 12, wherein the cleaning sequence process includes at least one of a process for impressing to the means for transferring, the voltage of the opposite polarity of an image forming process, and a process for impressing to the means for transferring, the voltage of the same polarity.

14. The image forming device according to claim 12, wherein the cleaning sequence process includes at least one of a process for impressing to the means for developing, the voltage of the same polarity and lower than an image forming process, and a process for not impressing a voltage.

15. The image forming device according to claim 12, wherein the means for forming the image includes means for diffusing toner adhered on the means for carrying, and the cleaning sequence process includes one of a process for impressing to the means for diffusing, the voltage of the opposite polarity of an image forming process, and a process for impressing to the means for diffusing, the voltage of the same polarity.

16. The image forming device according to claim 12, wherein the means for forming the image includes means for uniformly charging the means for carrying, and the cleaning sequence process includes a process for impressing to the means for charging, the voltage of the opposite polarity of an image forming process.

17. The image forming device according to claim 12, wherein the second means for controlling stops the cleaning sequence process when the print permitting signal is not output from the means for scanning even after an elapse of a predetermined period of time.

18. The image forming device according to claim 1, further comprising:  
means for detecting environmental condition in the image forming device;

means for cooling that includes at least one of means for taking outside air into the image forming device and means for exhausting air in the image forming device;

means for driving the means for carrying;

a first means for controlling that operates the means for cooling when a condition detected by the means for detecting satisfies a predetermined condition;

means for timing that starts counting when the means for driving stops

driving; and

a second means for controlling that stops the means for cooling when the means for timing expires.

19. The image forming device according to claim 18, comprising:  
means for fixing toner transferred onto paper by heat,  
wherein the means for detecting detects a temperature of the means for fixing.

20. An image forming method comprising:  
impressing to a transfer roller, a voltage of an opposite polarity to a polarity of when a toner image is transferred onto a recording paper, for a prescribed period of time during a period when a recording paper is absent in a transferring nip where a photoconductive drum and the transfer roller are in contact; and

impressing to a developing roller, a voltage of a same polarity as when developing an electrostatic latent image by toner and that is lower than a developing process, when a field of the photoconductive drum impressed with the voltage of the opposite polarity by the transfer roller passes a developing nip where the developing roller and the photoconductive drum are in contact.

21. The image forming method according to claim 20, further comprising stopping a rotation of the photoconductive drum after the photoconductive drum makes at least one rotation after a field of the photoconductive drum located at the transferring nip reaches the developing nip, when the voltage impressed to the transfer roller is switched off.

22. The image forming method according to claim 20, further comprising:

forming the electrostatic latent image by irradiating laser light on the photoconductive drum by a laser scanner unit that includes a polygon motor; and

rotating the polygon motor under a prescribed rotation speed for a predetermined period of time after an image forming process.

23. The image forming method according to claim 22, further comprising ending the image forming process when the photoconductive drum stops.

24. The image forming method according to claim 22, further comprising ending the image forming process when a recording paper transporting device that transports a recording paper stops.



25. The image forming method according to claim 22, further comprising setting the predetermined period of time.

26. The image forming method according to claim 25, further comprising:

clocking a time from an end of a previous image forming process until a start of a next image forming process;

storing clocking results by accumulating in a memory; and

setting the predetermined period of time in accordance with one or a plurality of the clocking results stored in the memory.

27. The image forming method according to claim 20, further comprising differing a start of driving of a main motor for driving the photoconductive drum and a start of driving of a sub motor for driving at least a part of a recording paper transporting device.

28. The image forming method according to claim 27, further comprising starting the driving of the sub motor after starting the driving of the main motor.

29. The image forming method according to claim 20, further comprising differing a stop of driving of a main motor for driving the photoconductive drum and a stop of driving of a sub motor for driving at least a part of a recording paper transporting device.

30. The image forming method according to claim 29, further comprising stopping driving of a second motor before stopping driving of a first motor.

31. The image forming method according to claim 20, further comprising:

starting driving of a polygon motor for rotating a polygon mirror of a laser scanner unit at a same time as when starting driving of a main motor for driving the photoconductive drum and the transfer roller; and

executing a cleaning sequence process for returning toner adhered on the transfer roller back to an image carrier during a period from a start of driving of the polygon motor until a print permitting signal is output by the laser scanner unit.

32. The image forming method according to claim 31, further comprising executing to the transfer roller during the cleaning sequence process, at least one of a process for impressing a voltage of an opposite polarity to an

image forming process and a process for impressing a voltage of a same polarity.

33. The image forming method according to claim 31, further comprising executing to the developing roller during the cleaning sequence process, at least one of a process for impressing a voltage of a same polarity and lower than an image forming process and a process for not impressing a voltage.

34. The image forming method according to claim 31, further comprising executing to a diffusing brush that diffuses toner adhered on the photoconductive drum during the cleaning sequence process, one of a process for impressing a voltage of an opposite polarity to a polarity of an image forming process and a process for impressing a voltage of a same polarity.

35. The image forming method according to claim 31, further comprising executing to a charger that uniformly charges the photoconductive drum during the cleaning sequence process, a process for impressing a voltage of an opposite polarity to a polarity of an image forming process.

36. The image forming method according to claim 31, further comprising stopping the cleaning sequence process when a print permitting signal is not output from the laser scanner unit even after an elapse of a predetermined period of time.

37. The image forming method according to claim 20, further comprising:

detecting environmental condition in an image forming device;

operating a cooling device that includes at least one of an air intake fan for taking outside air into the image forming device and an exhaust fan for exhausting air in the image forming device, when a detected condition satisfies a predetermined condition;

counting a timer when a main motor for driving the photoconductive drum stops; and

stopping the cooling device when the timer expires.

38. The image forming method according to claim 37, wherein the environmental condition in the image forming device is a temperature of a fixing device for fixing toner transferred onto a recording paper by heat.

39. An image forming device comprising:

an image forming unit that includes a photoconductive drum which carries an electrostatic latent image, a developing roller which forms a developing nip by contacting the photoconductive drum and develops the latent image by using toner, and a transfer roller that forms a transferring nip by contacting the photoconductive drum and transfers a toner image onto a recording paper;

a transferring voltage impressing circuit that impresses to the transfer roller, a voltage of an opposite polarity to a polarity of a transfer process, for a prescribed period of time during a period when the recording paper is absent in the transferring nip; and

a developing voltage impressing circuit that impresses to the developing roller, a voltage of a same polarity as a developing process and lower than the developing process when a field impressed with the voltage of the opposite polarity by the transferring voltage impressing circuit passes the developing nip.

40. The image forming device according to claim 39, wherein the photoconductive drum stops rotating after making at least one rotation after a field located at the transferring nip when the voltage impressed to the transfer roller is switched off reaches the developing nip.

41. The image forming device according to claim 39, further comprising:

a laser scanner unit that includes a polygon motor and forms an electrostatic latent image by irradiating laser light on the photoconductive drum; and

a controller that rotates the polygon motor at a prescribed rotation speed for a predetermined period of time even after the image forming unit

stops.

42. The image forming device according to claim 41, wherein the image forming unit stops when the photoconductive drum stops.

43. The image forming device according to claim 41, wherein the image forming unit stops when a recording paper transporting device that transports a recording paper stops.

44. The image forming device according to claim 41, wherein the predetermined period of time can be set.

45. The image forming device according to claim 44, further comprising:

a timer that clocks a time from an end of a previous driving of the image forming unit until a start of a next driving of the image forming unit;

a memory that accumulates and stores clocking results of the timer; and

a setting device that sets the predetermined period of time in accordance with one or a plurality of the clocking results stored in the memory.

46. The image forming device according to claim 39, further comprising:

a main motor that drives the image forming unit;

a recording paper transporting device that transports a recording paper;

a sub motor that drives at least a part of the recording paper transporting device; and

a controller that differs timings of a start of driving of the main motor and a start of driving of the sub motor.

47. The image forming device according to claim 46, wherein the controller starts to drive the sub motor after the main motor starts driving.

48. The image forming device according to claim 39, further comprising:

a main motor that drives the image forming unit;

a recording paper transporting device that transports a recording paper;

a sub motor that drives at least a part of the recording paper transporting device; and

a controller that differs timings of a stop of driving of the main motor and a stop of driving of the sub motor.

49. The image forming device according to claim 48, wherein the controller stops the driving of the sub motor before the main motor stops driving.

50. The image forming device according to claim 39, further comprising:

a main motor that rotates the photoconductive drum and the transfer roller;

a laser scanner unit that includes a polygon mirror and a polygon motor that rotates the polygon mirror;

a first controller that starts driving of the polygon motor and the main motor at a same time; and

a second controller that executes a cleaning sequence process to return toner adhered on the transfer roller back to the photoconductive drum during a period of time from the start of the driving of the polygon motor until a print permitting signal is output by the laser scanner unit.

51. The image forming device according to claim 50, wherein the cleaning sequence process includes at least one of a process for impressing to the transfer roller, a voltage of an opposite polarity to a polarity of an image forming process, and a process for impressing to the transfer roller, a voltage of same polarity.



52. The image forming device according to claim 50, wherein the cleaning sequence process includes at least one of a process for impressing to the developing roller, a voltage of a same polarity and lower than an image forming process, and a process for not impressing a voltage.

53. The image forming device according to claim 50, wherein the image forming unit includes a diffusing brush that diffuses toner adhered on the photoconductive drum, and the cleaning sequence process includes one of a process for impressing to the diffusing brush, a voltage of an opposite polarity to a polarity of an image forming process, and a process for impressing to the diffusing brush, a voltage of same polarity.

54. The image forming device according to claim 50, wherein the image forming unit includes a charger that uniformly charges the photoconductive drum, and the cleaning sequence process includes a process for impressing to the charger, a voltage of an opposite polarity to a polarity of an image forming process.

55. The image forming device according to claim 50, wherein the second controller stops the cleaning sequence process when the print permitting signal is not output from the laser scanner unit after an elapse of a predetermined period of time.

56. The image forming device according to claim 39, further comprising:

an environmental condition detecting device that detects an environmental condition in the image forming device;

a cooling device that includes at least one of an air intake fan that takes outside air into the image forming device and an exhaust fan that exhausts air in the image forming device;

a main motor that drives the photoconductive drum;

a first controller that operates the cooling device when a condition detected by the environmental condition detecting device satisfies a predetermined condition;

a timer that starts counting when the main motor stops driving; and

a second controller that stops the operation of the cooling device when the timer expires.

57. The image forming device according to claim 56, further comprising:

a fixing device that fixes by heat, toner transferred onto a paper;

wherein the environmental condition detecting device is a temperature detecting sensor that detects a temperature of the fixing device.